approach

APRIL 1982 THE NAVAL AVIATION SAFETY REVIEW

ALL too often, when a flier is seen hefting two blue volumes at once (his NATOPS Manual and OPNAVINST 3710.7K), his squadron mates will walk up to him and say, "What's going on? Do you have a checkride soon?"

Ah, those checkrides! As you study for your oral brief, ghosts of forgotten flight school memories intrude upon your concentration . . . Lonesome Joe the Prospector . . . the wildlife refuge again . . . resort areas . . . and poultry farms how many thousands of feet below?

We shouldn't merely reacquaint ourselves with Lonesome Joe and his numerical buddies once a year. Try this quiz right now, in the privacy of your own mind. It sure beats having your NATOPS officer ask you the same questions during an AOM, out loud, in front of the whole coffee drinking world, or worse yet, not knowing the information when you really need it – at altitude.

Readyroom Talk

This quiz is based on information contained in General NATOPS (OPNAVINST 3710.7K). The answers are at the bottom of the page.

GENERAL NATOPS

1. Routine change recommendations are submitted directly to:
   A. Naval Safety Center
   B. CNO
   C. The type commander

2. A dive angle of 50 degrees is defined as aerobatic flight.
   A. True
   B. False

3. The rules governing participation of naval aircraft in celebrations are found in:
   A. OPNAVINST 3750.6M
   B. OPNAVINST 4790.2B
   C. OPNAVINST 3710.7K
   D. SECNAVINST 5720.44

4. Commanding officers of fixed wing and helicopter squadrons may specifically designate anyone under their command as a "taxi pilot."
   A. True
   B. False

5. A mission commander is responsible for all phases of an assigned mission except:
   A. Weapons deployment
   B. When the aircraft is carrying a nuclear weapon
   C. Safety of flight relating to physical control of the aircraft
   D. When a flag officer is embarked

6. Navy and Marine Corps flight personnel are not authorized to purchase aircraft fuel/oil from other than military or contract sources except:
   A. On a flight classified as official business
   B. When a flight is terminated as the result of an emergency
   C. When the flight terminates at an alternate airport instead of the filed destination
   D. All of the above

7. An alternate airport is not required when the destination weather is forecast to be equal to or better than 2,500 feet ceiling and 3 miles visibility from 1 hour before to 1 hour after ETA.
   A. True
   B. False

8. When out of controlled airspace and over designated mountainous terrain, as shown in DOD flight information publications, an aircraft may be flown ______ feet above the highest terrain or obstacle within ______ miles of the intended line of flight.

A.	3,000	25
B.	1,500	20
C.	1,000	20
D.	1,000	22

9. Commercial carriers and civil aircraft shall be scrupulously avoided by:
   A. 300 feet vertically or 1 mile laterally
   B. 500 feet vertically or 1 mile laterally
   C. 500 feet vertically or 2,000 feet laterally
   D. 300 feet vertically or 500 feet laterally

10. Which of the following statements is true?
   A. Flight personnel in combat or flying from an aircraft carrier may donate blood within 20 days prior to such flying
   B. Flight personnel may donate blood on a regular schedule
   C. Flight personnel donating 450cc of blood may fly after 48 hours
   D. Flight personnel shall not be regular blood donors

Answers

1. B – para 102a, pg. 1-1
2. A – para 120b, pg. 1-3
3. D – para 201h, pg. 2-1
4. B – para 204b, pg. 2-3
5. C – para 233, pg. 2-8
6. D – para 263, pg. 2-11
7. B – para 325e, pg. 3-5
8. A – para 411g(2), pg. 4-3
9. B – para 428, pg. 4-6
10. D – para 721k, pg. 7-7

approach

An H-3 Sea King is silhouetted on the flight deck of the USS KENNEDY. Photo by Thomas Ackerman.

Vol. 27 No. 10
NAVAIR 00-75-510

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Tail rotor

Case 1: An H-53 is near max gross weight, the D. A. is 3,600 feet, winds are calm. During HOGE (hover out of ground effect) at max power available, the aircraft begins a slow turn to the right, and its external load is released. Still, the aircraft continues its right turn and descends into a slope, where it crashes and burns, resulting in multiple fatalities.

Case 2: An H-1, about to be lifted into a hover check, indicates 6,400 RPM. The pilot starts to take off, pulling in power prior to translational lift to clear obstacles, while N_f bleeds to 6,200 RPM. He lowers the collective to regain RPM, and starts a turn to the left to clear the area. RPM bleeds to 5,800 and the helo starts a slow, descending spin to the right and crashes. (The aircraft is over max gross weight.)

Case 3: The pilot of an OH-58 makes a slow downwind turn at 100 to 150 feet AGL, allowing airspeed to decrease and causing loss of translational lift. The helo's right turn cannot be stopped. The pilot rolls off the throttle and lands hard.

To better understand the cause of these mishaps

performance (or lack of)

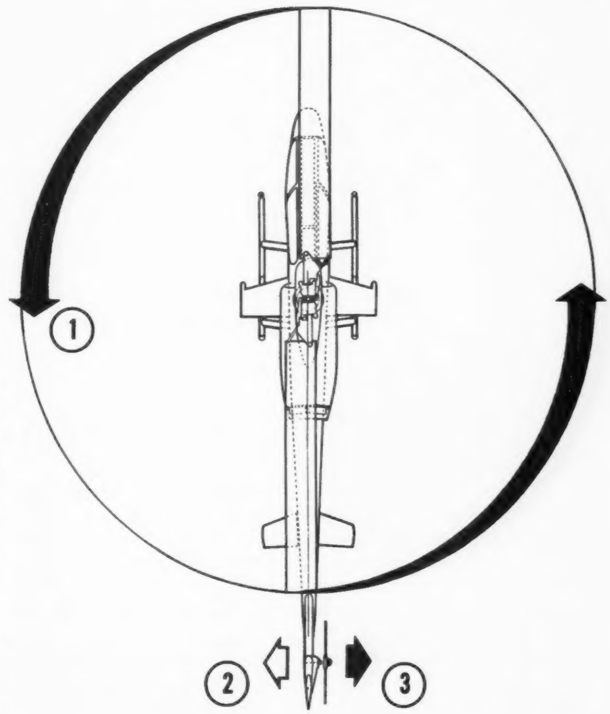
By LT Bert G. Outlaw
HS-5

Let's review some *tail rotor aerodynamics.*

The tail rotor's primary function in most single-rotor helicopters is to compensate for main rotor torque reaction, as well as provide for heading control, while maintaining trimmed flight and preventing the fuselage from rotating in autorotation. Since tail rotor speed is a function of main rotor speed through the transmission, and since more tail rotor thrust is produced by increasing blade pitch and tail rotor torque, it follows that more power is required from the engine to produce the necessary additional tail rotor thrust. On applying left rudder, the tail rotor thrust is increased and the tail rotor will pull (or push, depending on which side of the fuselage the tail rotor is on) the tail around to the right. (See Fig. 1.) Since the tail rotor needs extra power to do this, the power available for the main rotor will be reduced. To illustrate, the next time you're sitting in a hover, do a left pedal turn and watch the torquemeter increase. Typically, between 9 and 16 percent of the total horsepower available goes to the tail rotor during a hover.

These mishaps happened because the physical limits of the tail rotor's ability to develop thrust were exceeded (loss of tail rotor authority). Pilot clues of this situation are *full left pedal applied* and *helo starting a turn to the right*. Unfortunately, the maximum demands of the tail rotor occur at conditions where engine power is also in great demand, as in:

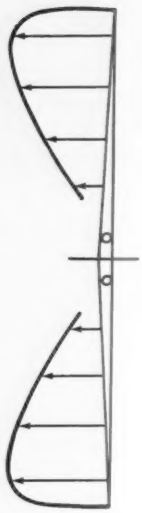
- High-density altitude.
- High OAT.
- High gross weight.
- Hovering out of ground effect.
- High humidity (a 10 percent increase in humidity increases D. A. about 100 feet).
- Low airspeed and/or steep angles of bank when it is necessary to maintain airspeed/altitude.
- Confined areas (loss of wind for translational lift when



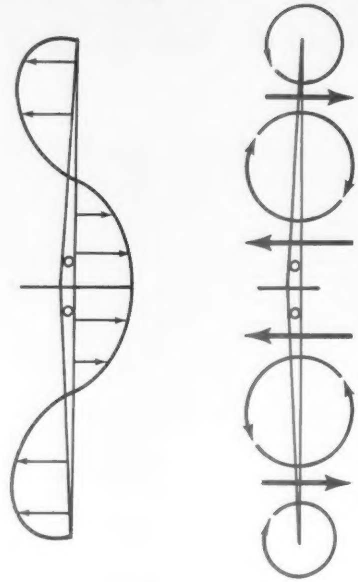
1. Rotation direction of engine-driven main rotor.
2. Torque effect rotates fuselage in direction opposite to main rotor.
3. Tail rotor counteracts torque effect and provides positive fuselage heading control.

COMPENSATING TORQUE REACTION
Fig. 1

TAIL ROTOR AS VIEWED FROM REAR OF HELO



INDUCED FLOW VELOCITY
DURING HOVERING FLIGHT



INDUCED FLOW VELOCITY
DURING VORTEX RING STATE

Fig. 2

a helo descends below the tree line).

- Hovering over uneven surface (part of rotor disk over a ship deck and part out of ground effect).

In addition, large amounts of engine power are required in a multiengine helicopter during single-engine water takeoffs and single-engine shipboard landings. (Power turbine droops of 2 to 3 percent are not uncommon at high power settings.) This could result in approaching the limits of tail rotor thrust.

What kind of flow environment does the tail rotor operate in? Let's take a look.

Vortex Ring State. With left crosswind or left sideward flight, the normal air flow being drawn through the tail rotor disk is resisted. With high winds or fast sideward flight, the tail rotor can be put into the vortex ring state (flight in its own rotor wash). (See Fig. 2.) In addition, a rapid right turn rate in a hover will also result in a tail rotor vortex ring state (power settling in a *horizontal* plane). As with operating in the vortex ring state of the main rotor, increasing power (left pedal) aggravates and increases the rate of turn, while decreasing thrust (right pedal applied) and gaining airspeed helps alleviate the problem. A light wind from the left will be beneficial, since it will tend to act on flat plate areas of the fuselage, aiding in pushing the tail to the right.

Right Crosswind. A right crosswind acting on the fuselage flat plate area tends to push the tail around to the left, thus requiring more tail rotor thrust to maintain heading.

Main Rotor Wake Downwash Impinging on a Tail Rotor. How much this downwash affects the tail rotor depends on how high the tail rotor sits on the vertical fin, the distance from the main rotor blade, and wind and/or taxi speed.

Wingtip Vortex. (See Fig. 3.) Interaction of a tail rotor with main rotor disk wingtip vortices. A wind tunnel study has determined that this has the greatest effect on tail rotor performance. This interaction usually occurs in right front quartering winds. This wingtip vortex is the same type that extends from the wingtip of fixed-wing aircraft. You remember that the airplane vortex is most powerful when the airplane is slow and heavy? Same for the helicopter. The puller (tractor) type tail rotor (on the right side of the vertical fin) is affected to a much greater degree by wingtip vortex than the pusher type tail rotor (on left).

Ground Vortex. (See Fig. 4.) Interaction of the tail rotor, vertical fin, and horizontal stabilizer in ground effect during rearward flight or while hovering downwind can cause main rotor downwash wake to roll up, interfering with tail rotor thrust. Ground vortex adversely affects tail rotor thrust when the tail rotor rotates in the same direction as the vortex (bottom blade aft).

Adverse effects of tail rotor interaction with main rotor downwash, ground vortex, and wingtip vortex are lessened when the direction of tail rotor rotation is bottom blade forward.

APPROACH (USPS 016-510) is a monthly publication published by Commander, Naval Safety Center, Norfolk, VA 23511. Subscription price is $15.00 per year; $3.75 additional for foreign mailing. Subscription requests should be directed to: Superintendent of Documents, Government Printing Office, Washington, DC 20402. Controlled circulation postage paid at Norfolk, VA.

RIGHT CROSSWIND

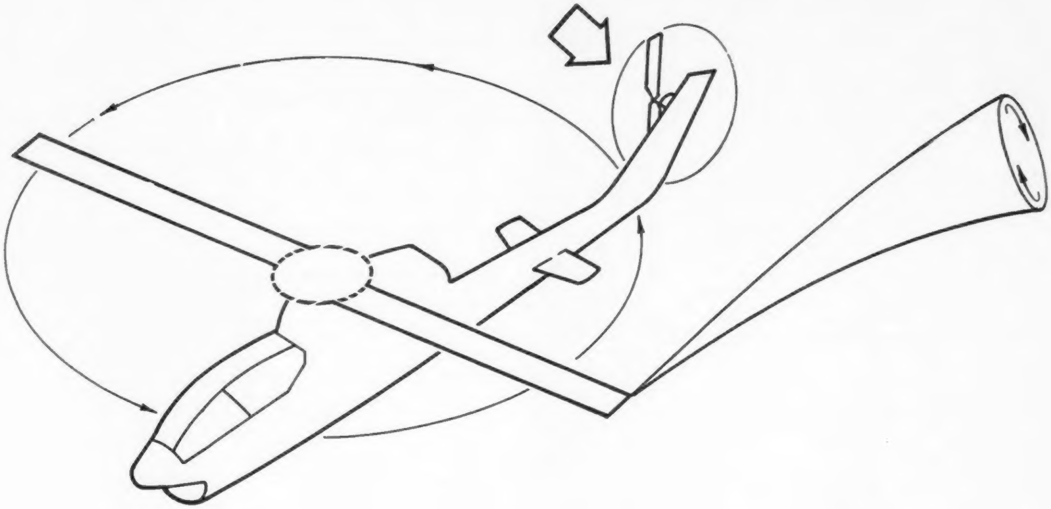


Fig. 3

So, in addition to the situations mentioned previously (high power requirements) affecting tail rotor performance, we can add:

Wind. A no-wind situation requires more power, and therefore more tail rotor thrust, while turbulent, gusty winds (around ships, for instance) cause tail rotor interference problems. Dynamic interface tests are done by Patuxent River test pilots to establish the helicopter shipboard launch-recovery envelopes. During these tests, it has been found that, with single-engine operations in a multiengine helicopter under similar ambient (D. A., altitude, wind) and loading conditions, landing aboard a small platform ship requires 3 to 10 percent more power to hover (thus more tail rotor thrust) than landing ashore. This is due to turbulent air in the vicinity of the ship, loss of ground effect for those portions of the rotor disk overhanging the flight deck, and interfering effects of the superstructure. Criteria used in establishing these operating limits during launch and recovery include pilot flight control techniques when a helo is within 10 percent of its tail rotor authority. You can see that by overcontrolling on the pedals, a pilot could easily begin to exceed the capability of the tail rotor.

Hovering downwind with high winds.

Slow right turn downwind. A lot of power is required in this situation, setting the helo up for tail rotor flight in the vortex ring state.

Tail rotor rigging. If the tail rotor is not rigged properly, it will not be capable of delivering the required thrust. A sister service did a one-time inspection of tail rotor rig on a particular helicopter and found a large percentage of its helo fleet

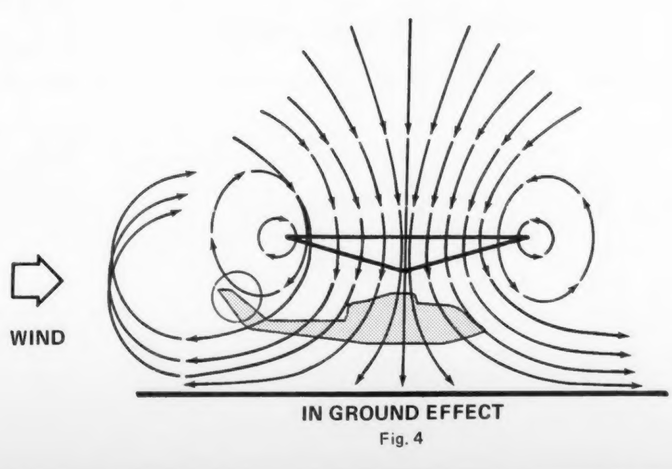


Fig. 4

misrigged.

Staying constantly prepared for the worst requires knowledge, skill, and experience. You must be able to identify symptoms and correctly interpret them.

The best way to deal with loss of tail rotor control is to avoid and anticipate, during preflight planning, the conditions that would require maximum tail rotor thrust. Watch for combinations of:

- Power required near maximum available.
- Low indicated airspeed.
- OGE flight.
- Increasing collective when right turn starts.
- Landing or takeoffs downwind or crosswind.

To keep your tail rotor authority:

- Decide to abort landing prior to losing translational lift.
- When conducting turns at high gross weight, be aware of wind direction and velocity. Stay in translational lift and avoid high angles of bank.
- Refrain from abrupt left pedal inputs.
- Don't allow right yaw rate to increase. Instead, reduce power.
- Make initial hovering turns to the left. By doing this, the turn should stop if wind is too high for available tail rotor thrust. If your initial turn is to the right, right yaw rate (momentum) could build to a point where full left pedal cannot stop the turn.
- Use aircraft performance charts in computing power available, leaving a reasonable power margin for unexpected maneuvering.

Corrective Action. Well, we've tried to avoid losing our tail rotor authority, but let's say we've let ourselves get in a situation where we'll start turning right with full left pedal applied. There is no recovery procedure for this addressed in most NATOPS Manuals, other than autorotation for loss of thrust. If in a low hover, terrain permitting, reducing throttle(s) and doing a hovering autorotation appear valid, but conditions of high altitude, rough terrain, or slow airspeed don't make this advisable. Anticipating conditions might dictate that, as main rotor RPM begins to decay, lower the collective, increase airspeed, initiate a right turn to unload the tail rotor, and go around while there's sufficient altitude.

I feel that a successful recovery involves three steps:

1. Reduce power, if altitude permits. A torque reduction reduces demand for tail rotor thrust.
2. Reduce left pedal inputs.
3. Move the cyclic slightly forward to smoothly accelerate.

These corrective actions are only my opinions. They are intended to stimulate thought and discussions, and maybe provide a little insight into a potentially dangerous area. Ideally, a gauge in the cockpit indicating when the tail rotor is nearing the limits of its authority would help prevent such mishaps. Also, NATOPS charts could be developed to aid in flight planning for loss of tail rotor authority. But until these things happen, we should know the conditions and situations that characterize loss of tail rotor authority. ◄

Paddles contact

By LT C. E. Nangle
VF-51 LSO

CCA: 107, Below glidepath, centerline is left, 1½ miles.
Pilot: 107, Roger. *(Can't believe this weather.)*
LSO: 107, Paddles contact, bring it left. *(How'd he get over there?)*
Pilot: 107, Roger. *(How'd I get over here?)*
CCA: 107, Centerline is left, correcting, below glidepath, three-quarter miles, call the ball.
Pilot: 107, Clara. *(Oh, great . . .)*
LSO: (Oh, great . . .) You're still below glidepath. Bring it up a bit.
Pilot: Got a ball, auto.
LSO: Go manual, working 4 degrees, 41 knots.
Pilot: (Go WHAT!?) Rog.
RIO: (The deck's moving.)
LSO: Deck's down, hold what you've got . . . *(How's his lineup?)*
Pilot: No ball. *(Why me?)*
LSO: Looking good, keep the power on it. *(Why me?)*
Pilot: (There it is . . .) Ball.
RIO: (Whew!)
LSO: Deck's coming up, a little power on it . . . *(C'mon.)*
Pilot: (C'mon.)
LSO: A little power, right for line . . . POWER!!
Pilot: (Aaaagh!)
RIO: (Aaaagh!)
Boss: Throttle back son, we gotcha!
Pilot: (Expletive deleted.)
RIO: (Expletive deleted.)
LSO: (Expletive deleted.)
CCA: 312, Well above glidepath, centerline is right, paralleling, 2 miles . . .

Many of you have no doubt experienced situations similar to this at some time in your career. You can't believe the weather; you can't believe you're still alive. You thank your lucky stars for Paddles. All that talking plus all your flying got your plane back on deck, and you may wonder "Who flew the pass, me or him?" There is only one answer, *you did.*

It is the charter of the Landing Signal Officer to ensure the safe and expeditious recovery of aircraft aboard the ship. The LSO's responsibility to you and the air wing is:

to keep you off the ramp
to keep you off a foul deck
to teach you proper landing techniques
to monitor your progress
to grade your passes

As such, the pilot and LSO form a professional and disciplined team with a common goal – getting the aircraft aboard. For the most part, the aviator does it on his own, but occasionally, when needed, the LSO is there to help; he "climbs in there with you." Still, you've got to know when he's climbed out. LSOs make three types of voice calls: *informative* calls, used to inform pilots of existing situations ("Roger Ball; you're lined up left."); *precautionary* calls, used to direct pilots' attention to potential difficulties and prevent possible control errors ("Don't settle. Hold what you've got."); and *imperative* calls, used to direct pilots to execute a specific control action ("Power. Right for lineup. Wave off.") **Mandatory, immediate response** is required. Additionally, there are those finesse calls designed to provide that extra margin of safety the pilot may need. All this can add up to a lot of voice communication in adverse conditions and the feeling that the LSO has taken control of your actions. Nothing could be further from the truth, for when it gets down to brass tacks, there is only one set of hands on the controls – **yours.**

The point of all this is that *you* are the pilot; the LSO is your assistant. You are tasked with landing your aircraft aboard the carrier. On those rare occasions where you need help, the LSO will "climb in there" with a voice call. As soon as the call is answered, he "climbs out," and you're on your own until you may need help again. Remember, it's your aircraft, your pass, and your life.

Fly the ball . . .

No Time for Traffic Calls. Returning from an afternoon roundrobin, and under the positive control of Western Center, the pilot of an F-14 was instructed to descend from FL230 to 8,000 feet on a vector of 230 degrees. Passing through 15,000 feet, a near-midair collision occurred with a light civilian, single-engine aircraft, thought to be a *Cessna 210*. Weather at the time was VMC, visibility 4-5 miles, horizon partially obscured by haze, no clouds.

No traffic calls were passed to the crew of the F-14 by the center controller prior to the near-miss, and neither aircraft had time for evasive action after visual acquisition. The closest point of approach was estimated to be within 200 feet, with the civilian aircraft flying directly in front of the F-14. Immediately following this incident, the pilot contacted the center controller and was told, "I don't have time for traffic calls right now," or words to that effect. Repeated attempts were made by the F-14 crew to communicate the severity of the near-miss, but their pleas were deferred by the controller. The F-14 was subsequently passed to NAS Homeplate Approach Control, and an uneventful landing was executed.

This incident serves as another grim reminder that, even though an aircraft is on an IFR flight plan, ATC procedures are not infallible. The F-14 crew should have been advised by Western Center, prior to entering their airspace, that a "high workload" existed and normal traffic advisories would have to be curtailed. The crew was unaware of this condition until well after the near-miss occurred. Additionally, the civilian aircraft was required to have an operating transponder since it was at an altitude above 12,500 feet and the controller should have received a 1200 code from that aircraft and alerted the F-14 crew.

Fortunately, the F-14 was operating in VMC conditions and spotted the civilian aircraft before a midair collision occurred. Nevertheless, the gravity of a situation such as this cannot be overstated. Had there been an actual collision, the low priority given to traffic advisories because of a heavy workload would have been a poor excuse. It's obvious, once again, that when operating in an airspace, especially a high-density area, extreme vigilance is required on the part of pilots and crews. The best defense is the old Mk1 eyeball.

Harried Harrier. A flight of two AV-8A *Harriers* returned to NAS Patuxent River following a 25mm gun captive carriage evaluation. Maj Mike Stortz was in the lead aircraft. Out of the break, as nozzles were lowered for landing, Maj Stortz detected longitudinal stick binding. With the stick held forward against the binding, he reduced nozzle angle to counter the noseup pitching tendency. Maj Stortz discovered that the stick could not be positioned further than approximately midstick travel.

An emergency was declared, and Maj Stortz set up for a low, flat, wide approach. Nozzle angle was reduced to obtain the lowest possible approach speed while still maintaining longitudinal control with the restricted forward-stick travel. The approach was flown at 190 KIAS, with full flaps and nozzles at 20 degrees. Maj Stortz's problems were still not over, since he had to control the high-speed *Harrier* on the runway. Porpoising was controlled using power nozzle braking, and a tricky landing was successfully completed.

A postflight maintenance investigation revealed that a 3-inch diameter

pulley wheel from a specially installed elevator position sensing device had worked loose from its spindle and become lodged in the lower support structure in the tail. This inhibited travel of the mechanical linkage to the horizontal stabilizer.

Maj Stortz's excellent airmanship saved an irreplaceable aircraft, and for that, he deserves a pat on the back and an Attaboy!

Grounded in the Air. An A-6E crew was making its last pass on the target range, with the pilot performing a level delivery of ordnance. An instant after the pilot depressed the weapons release button, he received an electrical shock. The pilot experienced involuntary muscle activity while grasping the control stick and throttle quadrant. He made several attempts to hold the stick and gain altitude, but each time, he received a severe shock. Finally, he was able to gain altitude by reaching around to the rear of the stick with his left hand. The pilot then flew the A-6E back to Homeplate, where a successful landing was made.

A postflight maintenance inspection revealed that the trim switch retaining screw potting compound had chipped away, allowing 115V electrical current to follow a path through the pilot's right hand, his chest, and ground through his left hand holding the throttle quadrant. He had been wearing gloves at the time of the incident.

The following corrective action was taken by the squadron involved in this incident:

- All squadron aircraft were given a one-time inspection to check the trim switch retaining screw potting compound.
- A briefed preflight item was added to check the pilot control stick for chipped or cracked potting.
- All aircrews were briefed on pulling the LAT LONG trim circuit breaker in the event of electrical shock from the pilot's control stick.

The pilot's CO remarked, "Having 115V in the control stick is a less than desirable situation. Other than elimination of the 115V, constant aircrew education is the next best method of attacking the problem. Proper preflighting of the stick grip — to include a tightly screwed on trim button as well as good potting compound — is a must. In this case, an experienced aviator's ingenuity in using his left hand around the rear of the stick (even while performing a high-speed ordnance run in) prevented a catastrophe. This should help educate those inexperienced A-6 crews who might not be aware of this problem."

This shock problem in the A-6 control stick has been addressed in past issues of the WEEKLY SUMMARY, the latest being No. 52-81 (20-26 December 1981). It's obvious that the best way to combat the problem is by ensuring all parts of the control stick are thoroughly checked prior to each flight. ◄

Riding it in:

By LT Lawrence H. Frank, MSC
Aeromedical Safety Officer
COMNAVAIRPAC

• YOU hit afterburner, quickly scan the gauges, and wipe out the cockpit. You're ready. Head back, salute, you're off. Or are you? Your heart rises to your throat and your stomach falls to your knees. It feels wrong. Where's the acceleration? It's a soft cat shot. What are you going to do? Eject or ride it in?

• You call the ball three-quarters of a mile out. Your line-up is good, but you're high. You're still high at the ramp, but it's salvageable. You touch down hard, go to military, and feel your body being reassuringly thrown forward as the hook snares the No. 2 wire. As you retard the power, you hear a loud bang and the aircraft simultaneously swerves hard to the left. The port tire has blown, and you're heading over the side. What should you do? Eject or ride it in?

What would you do in any similar situation? On what information is your decision based? The gouge your old flight instructor gave you? A real life escape and survival story that you heard at happy hour? How reliable are these sources of information? Reliable enough to bet your life on?

Many aircrew have and will make life-and-death decisions (their life or death) based upon erroneous data. "True-life" survival stories are not *always* the best sources of information. Several individuals have survived not because of what they did, but in spite of what they did. If you try to emulate their actions, you may very well die. You'll never hear from the people who died trying to perform the same acts advocated by the living testimonial.

Due to such misinformation, there are currently two popular, widespread, and very deadly beliefs. The first misconception is that you can ride an aircraft into the water in an over-the-side or a cold catapult situation and *easily survive*. The second is that, once you enter the water in your aircraft (assuming you survive the impact), you will be able to make a normal, manual egress. The purpose of this article is to temper these beliefs by providing you with accurate information on the aeromedical realities of riding an aircraft into the water.

A review of Naval Safety Center statistics from CY 1965 through CY 1980 reveals that riding an aircraft into the water is not a very good alternative to ejecting. Only 2 of the 42 individuals involved in water impact following a catapult launch and 6 of the 21 individuals involved in over-the-side impacts survived. Stated more specifically, 95 percent of those who rode it in off the catapult and 71 percent of those who rode it in over the side died. In addition, of the total of 9 individuals impacting the water following ramp strikes, all 9 died. In a Safety Center analysis of 66 fatal cases where no ejection took place, it has been estimated that at least 45 may

a reconsideration

have survived had ejection taken place in the envelope and no seat or survival problems occurred.

For those of you who are somewhat skeptical of statistics and require more convincing, listen up. From controlled crash tests of aircraft, formulae have been derived for various decelerative force pulse shapes which allow calculation of whole-body G forces and estimates of human survivability.

Tables I and II present the whole-body G forces and pulse durations for various aircraft speeds as a function of aircraft impact angle and stopping distance (after impact). These calculations assume a symmetrical triangular deceleration pulse shape, a final velocity equal to zero and, to simplify calculations, equal impact and flightpath angles.

Over-the-Side Impact Force Estimates

Impact Angle		Airspeed 10	20	30	40	50
10°	G	.87	4	8	14	22
	t	1.21	.57	.40	.30	.24
45°	G	.63	3	6	10	16
	t	1.66	.83	.56	.42	.33
60°	G	.71	3	6	11	18
	t	1.49	.75	.50	.37	.30
90°	G	.89	4	8	14	22
	t	1.17	.56	.39	.29	.24

Resultant G and pulse duration (t) in seconds as a function of impact angle and airspeed (kts) for a stopping distance of 10 feet.

Table I

Soft Catapult Impact Force Estimates

Impact Angle		Airspeed 80	90	100	110	120	130	140	150	160
10°	G	14	18	22	26	31	37	42	49	55
	t	.61	.54	.48	.44	.40	.37	.35	.32	.30
45°	G	10	13	16	19	23	27	31	36	40
	t	.84	.74	.67	.61	.56	.51	.48	.44	.42
60°	G	11	14	18	21	25	30	35	40	45
	t	.75	.66	.59	.54	.50	.46	.43	.40	.37
90°	G	14	18	22	27	32	38	44	50	57
	t	.59	.52	.47	.43	.39	.36	.34	.31	.29

Resultant G and pulse duration (t) in seconds as a function of impact angle and airspeed (kts) for a stopping distance of 40 feet.

Table II

The 40-foot stopping distance in Table II is a realistic estimate for a moderate-speed impact such as off the catapult, whereas the 10-foot stopping distance in Table I would be applicable to a low speed, over-the-side occurrence. Using Tables I and II and the rule that the higher the speed or the shorter the stopping distance the greater the G, you can estimate whole-body G forces for scenarios you feel most likely to encounter.

Be aware, however, that these calculations are in reality *underestimates* of the actual G forces encountered. This is because the formula used assumes the following: the human body is perfectly restrained, allowing no dynamic overshoot; the cockpit volume will remain large enough during impact deformation to sustain life; and, there won't be any flying debris to serve as impact projectiles. With each violation of one of these assumptions, the resultant whole-body G force increases.

Table III presents the human deceleration-force tolerance limits. In using this table, be aware that the values are not "hard numbers." They are simply "best guess" estimates. Note also that the G values are for a specific pulse duration. During short duration impacts (less than 0.02 seconds) the human body responds like porcelain. During longer exposures, it reacts like a hydraulic system. Consequently, long exposure to relatively low G value may be more damaging than a short exposure to a high G impact. Keeping in mind that the type of G forces you are most likely to experience during a catapult or over-the-side mishap are *eyeballs down* ($+G_Z$), *eyeballs out* ($-G_X$), and *eyeballs left or right* ($\pm G_Y$), compare Tables I and II to Table III. As can be seen, if you stay with the

Deceleration Force Tolerance Limits*

Position	Limit	Duration
Eyeballs-out ($-G_x$)**	45G	0.1 sec
	25G	0.2 sec
Eyeballs-in ($+G_x$)	83G	0.04 sec
Eyeballs-down ($+G_z$)	20G	0.1 sec
Eyeballs-up ($-G_z$)	15G	0.1 sec
Eyeballs-left ($\pm G_y$) -right	9G	0.1 sec

*Fully restrained subjects exposed to whole-body impact at up to 250 G/sec onset rate. Injury known to occur if exceeded.
**For lapbelt restraint only. $-G_x$ tolerance may be cut to 1/3 (adapted from the U. S. Naval Flight Surgeon's Manual, 1978).

Table III

aircraft in a low-speed, over-the-side mishap, your chances of surviving impact are better than riding the aircraft in off a catapult.

Suppose you *do* ride the aircraft in and survive. Your chances for escape may be complicated by injuries or a cockpit deformed by impact (for example, your feet may get caught beneath the rudder pedals or your survival gear may become entangled with broken aircraft structures). Since you are riding the aircraft in, it's obvious that you are below minimum flying speed and unable to control the aircraft's attitude at impact. You may crash inverted, wing down, or both. If you do, you will expose your body to the vectors of force which it least tolerates (see Table III). Finally, the ship may be unable to maneuver quickly enough to avoid hitting the aircraft and you.

If you fly an ejection seat aircraft, use the system in a timely manner and eject within the envelope. Riding the aircraft in is a poor and often fatal decision.

If you fly around the ship but have no ejection capability, there are a few things you can do to increase your chances of survival if you're forced to ride it in. Wear your oxygen mask if you have one. The MD and CRU series panel-mounted regulators, set to the 100 percent emergency setting, will provide you with underwater breathing capability while you're connected to the aircraft system. Be sure you're strapped in tight and your harness is locked. This decreases the chances of dynamic overshoot and the exponential increase in G forces. Store all loose gear to avoid lethal projectiles on impact. Have not only a primary exit for escape, but also a secondary and, perhaps, a tertiary exit. Be able to find your way to these exits blindfolded. Wear your survival gear and preflight it as well as you do your aircraft.

Notes:

- Although controlled water crash tests have not been performed, the symmetrical triangular deceleration pulse shape is considered the best approximation (Crash Survival Investigator's School, Arizona State University, 1979).
- Dynamic overshoot results from loosely secured restraints, including unlocked inertia reels. When the aircraft hits the surface, it begins rapidly decelerating while the loosely-restrained crewman continues traveling. In the short period between the aircraft's initial impact and the crewman contacting the restraining straps, the aircraft has decelerated considerably. The crewman must now match the aircraft's present velocity and must do so in a far shorter interval than did the aircraft. He therefore experiences greater G.

"301, I've got a problem..."

By LT Paul A. Pugliese
VA-37

FOLLOWING routine bombing practice, our trio of *Corsairs* headed out to the warning area to join the squadron tanker for some practice inflight refueling. I was Dash 2 in the flight, and hops of this nature had become routine during the last several months, with our air wing being the benefactor of a long turnaround cycle. "Plugs" complete, we started heading back to homeplate only to find the fourth *Corsair* in our division was airborne and headed our way. The lead elected to keep the flight together and hold the three of us overhead at 16,000 feet, while Dash 4 "hit" the tanker, 1,000 feet below us.

It was a beautiful spring day – clear skies, 7 miles plus visibility, free from the routine haze that often limits our visibility at NAS Southeast during this time of year. I intentionally loosened up on the lead to observe the tanking evolution taking place below us. Further separation was generated by my being positioned on the outside of a turn.

Several minutes later, in anticipation of Dash 4 completing his plugs, I smoothly advanced the throttle to military to close up on the lead. Having generated a good closure rate, I attempted to reduce power, only to find to my consternation that the throttle *would not budge.* A brief moment of disbelief was shattered by harsh reality as I made several more attempts to move the frozen throttle and scanned my engine instruments – all normal indications for a TF-41 turbofan at military power. My eyes jumped to the fuel gauge – less than 45 minutes of flying time. *(Get the nose headed back toward home, then you can start sorting this mess out.)*

"301, I've got a problem," I transmitted to the lead as I commenced my turn, 75 miles southeast of NAS.

He promptly broke away and joined on me, but retained communications lead. We switched to base frequency and sent the readyroom into GQ with the revelation of my situation. The speed of my SLUF descending to 14,000 feet at full power was only matched by the operations officer getting the news to the CO.

Having two radios in his aircraft, 301 cleared the way with Center and monitored base frequency, while I reviewed the pocket checklist and discussed procedures and particulars of my predicament with the squadron reps. My mind and heart raced. *(What could be causing the throttle to stick?)* Now squawking EMERGENCY, all indications continued to point toward having to secure the engine three-fourths of a mile from touchdown, at a high speed, and deadstick the aircraft into an arrested landing. *(Could be worse... at least power or a lack of it isn't going to be a problem.)*

Recalling a readyroom brief given by one of my RAG instructors who experienced a similar emergency, I consciously tried to relax and clear my mind, concentrating on how I would set up and execute the approach. *(The numbers... the numbers, fly it by the numbers.)*

Approaching the shoreline, I removed my kneeboard *(Won't be needing this; don't want it in the way.).* Upon going "feet dry," the RPM was reduced 2 percent by switching to manual fuel. Approach power control (APC) was engaged. Still, the power remained at military. My descent placed me at 1,000 feet, 400 knots, 15 miles southeast of the field. About 7 miles northeast, prior to a wide turn in, I sharply pulled the nose up in order to get down to gear and flap speed. With LSOs on station, I began a straight-in approach from 5 miles out to Runway 18. Using a combination of visual perception, the Fresnel lens, and calls from Paddles, I was able to hit the approach "window" on the first pass. The engine shut down virtually the instant the fuel master handle was secured, at three-quarters of a mile. The aircraft decelerated rapidly, and with speedbrakes now retracted, the *Corsair* touched down comfortably about 1,200 feet prior to the arresting gear and rolled into a clean engagement.

Postflight inspection of the throttle quadrant underneath the left-hand console revealed a floodlight cover wedged into the linkage, preventing aft movement of the throttle.

Lessons learned and points to be emphasized:

The lead's use of both radios, one to clear the flight through Center and the other to monitor my communications with base, significantly reduced my workload and enabled me to concentrate on the problems at hand.

The landing signal officer was invaluable in reaffirming my shutdown point.

There was a marked increase in deceleration following engine shutdown, lacking the turbofan's residual thrust at idle. This was most noticeable on landing rollout before engaging the arresting gear.

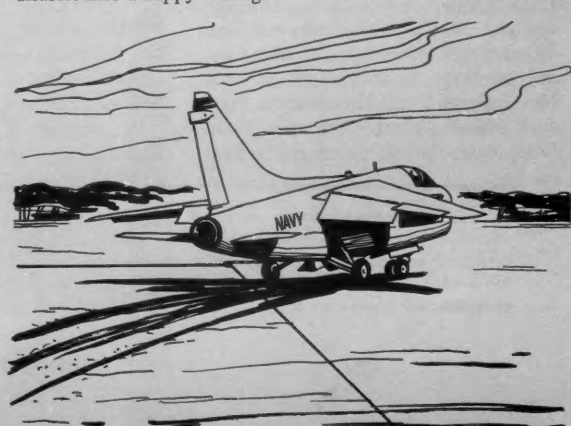
There were no control problems following engine shutdown. The windmilling engine and deployed EPP provided sufficient hydraulic power.

In retrospect, I submit that the application of negative G on the aircraft could have dislodged the wedged light cover, freeing the throttle completely, or at least enough to reduce power to a more moderate setting.

I was extremely fortunate that this emergency did not rear its ugly head in marginal weather conditions, at night, or during shipboard operations.

Readyroom discussion is invaluable in increasing pilot knowledge and savvy.

There is no substitute for following established procedures. Compliance with NATOPS procedures turned a potential disaster into a happy ending.



Up, Down or . . .?

THIS horror story started out like most – night carrier operations after a short inport period. The flight deck respot was late, so in the middle of my preflight I had to ride the brakes for a tow to the fantail. I hopped out, finished my preflight, and hopped back in to get started. The huffer showed up and after 5 minutes the driver ascertained that the huffer was down. Another 5 minutes went by before I finally had a starter hose attached. I got started and ran through my checklist to the point where my launch bar would not extend. Another 7 minutes of troubleshooting went by and finally a tripped circuit breaker was located, reset, and I was back in business for the night launch.

About this time, a not-so-friendly yellow shirt tells me that I'm down because it's too late to launch me. I tell him I'm up, but to no avail. On one side of the aircraft, a yellow shirt tells me to raise my launch bar. On the other side, my plane captain is telling me to continue with my checks (mistake #1). I look over at the yellow shirt who gives me the "hook up" signal and I comply (mistake #2). Ten seconds later out pops my plane captain from under the aircraft (hopefully with both hands and all his fingers!). Now the yellow shirt is telling me to start taxiing forward to get parked because I'm down (or am I up?). But something tells me all is not right! Holy smoke! Here I am taxiing – no mask on, canopy up, and headknocker down (mistake #3). I stop the aircraft, get suited up, and continue to taxi. I get up near No. 2 elevator and the assistant flight deck officer asks me if I'm up or down. (You mean he doesn't know?) So I tell him I'm up and want to launch. But I haven't finished all my plane captain checks yet, have I (mistake #4)?

A number of people around my airplane are hustling to get me on the cat for this launch. The AE troubleshooter pulls my ordnance pins, my downlocks, and my nose pin. He has a real handful of pins, and I really don't remember if I saw the nose gear pin (mistake #5). By this time the taxi director on the catapult is giving me the come ahead signal. So I approach the catapult without any trim checks, no wipe out of the cockpit, no viscous dampener check, no external transfer check, no AOA approach lights check, and my wings folded. The director tells me to drop my launch bar with my wings still folded! This time I finally do the one smart thing I do all night – **I stop.** I spread my wings, go through my takeoff checklist three times, and then proceed to the catapult. I get a good wipe out. Everything looks good. With my heart in my throat, I launch.

The rest of the hop was about as normal as any other night hop can be, but I had to reflect upon the numerous mistakes I had accomplished in about a 5-minute time span. I wasn't too happy with myself, but I was grateful that nobody had been hurt by my stupidity. Oh well, "with experience, knowledge." The moral of this story is:

(a) The author should have surgery to remove his head from his rump.

(b) The author should not be on a flight deck unless accompanied by an adult or a guardian angel.

(c) A severe case of can-do-itis and being rushed during the hectic pace of cyclic ops can do you in and you may die.

(d) All of the above. You might say (d) is the right answer, but today I'll just admit to (c).

A Toorushedmouse

The purpose of Anymouse (anonymous) Reports is to help prevent or overcome dangerous situations. They are submitted by Naval and Marine Corps aviation personnel who have had hazardous or unsafe aviation experiences. These reports need to be signed. Self-mailing forms for writing Anymouse Reports are available in readyrooms and line shacks. All reports are considered for appropriate action.

REPORT AN INCIDENT
PREVENT AN ACCIDENT

Midsummer Light Dream

OUR southern air station experiences midsummer thunderstorms almost every day, and these storms frequently result in power outages affecting the hangar area. At best, walking through a pitch black hangar during these periods of interrupted electric service can be hazardous to your health! The only areas in the hangar with emergency power provisions are the stair wells.

Power losses have occasionally lasted for periods of several hours, and a source of emergency power is badly needed. Imagine the mass confusion and danger that could result if a fire in an aircraft or the working spaces occurred during one of these failures!

Let's stop using lightning flashes as an emergency lighting source and provide our working spaces with an appropriate and reliable emergency lighting system!

Not an-owl-mouse

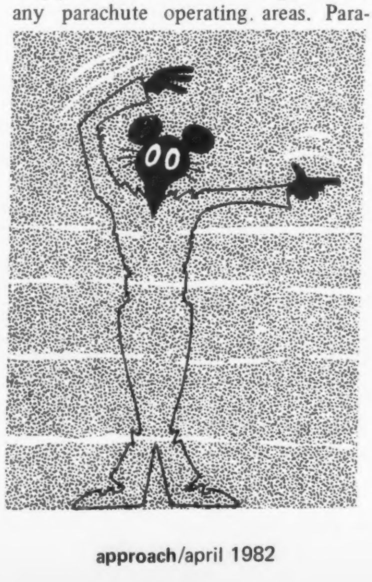
Transient Helo Welcome

SEVERAL days into a cross-country flight which was extended due to aircraft problems, we were *finally* on our way to NAS Homeguard. We had been alternately fixing and flying our H-46 since early morning and had just completed an uneventful night GCA to Jet Desert AFB. Following the tower's instructions, my trusty copilot landed long and made a right-off at the last taxiway. Upon clearing the runway, the helo was immediately engulfed by a swirling cloud of dust and debris. I took control and pulled enough collective to lift above the quagmire and, while doing so, noticed an orange and white parachute billowing in the rotor wash in front of the aircraft. The chute blew away without entering the rotor system. We air taxied the aircraft clear of the area and landed on a progressive taxiway. After ground taxiing behind a "follow-me," we were finally directed into parking by a taxi director who was marginally visible with no night wands.

It was later determined that the taxiway designated for the right-off was an unmarked *jet parachute drop area*; the high dust/foreign object presence was unexplained; and the taxi director's line shack explained that they "didn't have enough wands."

I love surprises, and I love new places, but I don't always love surprises in new places. Please, Mr. Base Commander/Field Manager/Safety Officer/Tower Operator, grant your future rotary-winged visitors the following professional courtesies:

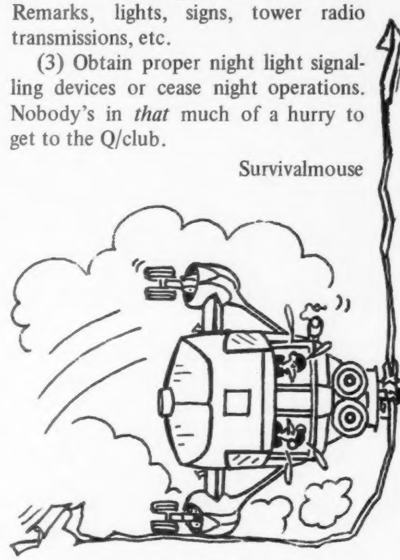
(1) Do not direct helicopters into any parachute operating areas. Parachutes and rotor blades do not mix.



(2) If necessary to operate aircraft in a high FOD/hazardous airfield area, make the hazard known via appropriate means: IFR Supplement Aerodrome Remarks, lights, signs, tower radio transmissions, etc.

(3) Obtain proper night light signalling devices or cease night operations. Nobody's in *that* much of a hurry to get to the Q/club.

Survivalmouse



Jet Blast and Helos

EVERY morning our helos launch at 0645. Invariably, when our helos are turning up on the flight deck, fixed-wing aircraft are directing their jet blast toward our aircraft. When one of our helos lifted off the deck, it was blown 90 degrees to starboard. The second time it happened, the pilot had started to lift when the aircraft started to dribble, skid, and bounce along the flight deck. He immediately sat the helo back on deck.

I see no reason why fixed-wing aircraft can't be started at a time and place so jet blast won't interfere with helos lifting off. To me this is a very dangerous situation. As a crewman, I have experienced this. It is extremely hazardous and has caused accidents. I have seen a helo flip over on the flight deck from jet blast. If something isn't done, it will happen again!

Been-there-beforemouse

Navy Skyhawks to Cessna Skyhawks

By CDR Richard P. Shipman, USNR
VC-12
and
Air Safety Investigator
National Transportation Safety Board

ANY Navy pilot who can land a tactical jet aircraft on a pitching carrier deck can fly one of those tinker-toy, civilian planes with absolutely no sweat, right? Wrong, Navy jet ace. I labored under that misconception until I left the Navy and started flying light aircraft for the first time. Was I in for a surprise!

My first revelation was how different general aviation is from Navy TACAIR. Uncontrolled airports, reciprocating engines, low-altitude airways, limited avionics, and flying with the left hand were just some of the new and strange experiences. But the greatest shock was the cost! After years of being well paid to fly Navy jets, it's somewhat difficult forking over $45 an hour for a fixed-gear, fixed-prop, 120-knot aircraft. The cost of flying has some very real ramifications in terms of proficiency, currency, and even the type of flight plan you file. With a typical flight costing in the neighborhood of $100, it's easy to see why you don't gain the proficiency or maintain the currency that you'd like to have. And after you've been vectored halfway around the world on an IFR flight plan, with the meter running, the temptation to fly VFR even in marginal VMC conditions is great.

If you love flying, though, and light planes are the only game in town, you'll find the money somewhere. I did, with the help of Uncle Sam, and plunged into the world of light plane flying.

It didn't take long to discover how cantankerous reciprocating engines can be to start. The turbojet engine is a marvel of reliability; I can't remember 10 bad starts in 3,000 hours jet time. But those pistons! When it's hot, they flood. When it's cold, they won't crank. If the engine is warm, a different starting procedure is needed. It is hard to convince your friends how good a pilot you are when you can't get the engine started.

Even after the pistons finally start pumping, the reciprocating engine requires special treatment and handling not necessary for a turbine. The first time I stiff-armed the throttle on a light twin, I thought my instructor would have a cardiac arrest. Slow airspeed climbs and fast descents are also out, to avoid overheating and overcooling. For pilots used to near-vertical climbs and 8,000 feet-per-minute descents, the operating limitations of a piston engine require some mental adjustments.

I had known that piston engines would be different, though, so the limitations were not really a surprise. What was a surprise was how high the workload can be on a sophisticated single or light twin. The cockpit workload of a tactical jet is high because everything is happening so fast. But the cockpits are well designed for single-pilot operation, controls are limited to stick, throttle, and rudder, and advanced avionics simplify many tasks. A typical light twin, in contrast, is relatively slow, but the pilot is required to do so much. Prop controls, mixture leaning, cowl flaps, engine-synchronizing, and manual flaps are all workload items unfamiliar to jet pilots. What's more, the instrumentation and avionics found in the typical rental aircraft don't do much to help. Precessing vacuum directional gyros and attitude indicators are the rule rather than the exception. Distance measuring equipment, RMIs, and HSIs are scarce due to their price. Navigational equipment on typical general aviation aircraft is limited to a pair of windshield-wiper-type VOR indicators and an ADF. Even routine communications are high workload items, as the pilot is required to locate the mike, remove it, transmit, then replace it in the holder. If he needs that hand for some other task, such as flying the aircraft, the mike will most likely end up on the floor. Make no mistake – an IFR approach in a light twin is a high-workload evolution. If any military pilot doubts this, he should try a fixed card ADF approach in a light twin, without inertial navigation, autopilot, TACAN, or VOR/DME.

Another revelation about general aviation aircraft was how hard they are to land well. Landing a Navy jet is certainly no snap, but you have some things going for you that don't exist in the light plane world. For example, even a small military jet such as the A-4 weighs around 15,000 pounds at landing weight. Also, the control forces are light and responsive. More important, carrier-designed aircraft don't bounce. You can punch the struts through the wings, but they don't bounce. Compared to a military jet, a light plane on final seems like a feather in the wind, bouncing, yawing, and rolling at the whims of the breeze. Trying to land a high-wing light plane in a gusty crosswind on a day with thermal activity is guaranteed to humble the hottest fighter pilot. Even when the winds are calm, learning to flare and touch down smoothly takes practice. My first several landings resulted in multiple touch-and-goes on the same pass as I floated and bounced well down the runway. The old military axiom "an extra 5 knots on final for the wife and each kid" just doesn't apply to general aviation.

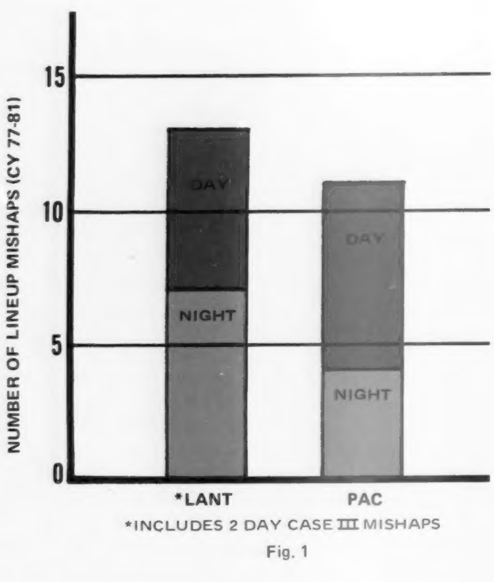
One unfortunate aspect of transitioning to light planes is the way the general aviation pilot is treated by some air traffic controllers. My impression has been that because you are flying a light plane, many ATC folks assume you don't know what you are doing. In some cases, they may be correct. Still, it's frustrating and unfair to receive a lesser degree of service just because of the equipment you are flying.

There have been many enjoyable and enlightening experiences as I've become involved with light plane flying, but there have also been some dangerous situations that have developed because I was not sufficiently familiar with the totally different environment and equipment of the general aviation pilot. *I now candidly admit that I approached my civilian flying overconfidently and underprepared.* Let's face it, humility isn't taught in military flight training, and it's difficult at first to take seriously an airplane that has a top speed slower than the stall speed of the aircraft you've flown for 2,000 hours. Still, the pilot who steps directly from a tactical jet into a light plane and expects to fly it as safely as he did his military craft is kidding himself. After one particularly bad landing that found me exploring the runway from side to side and end to end, I realized that my pride exceeded my proficiency. *I took several lessons starting in a basic trainer aircraft and moved up to a light twin.* With some basics under my belt I felt more comfortable and much safer in my new environment, and my proficiency has improved to a point where landings with more than two bounces are rare!

Many military pilots become involved in light plane flying either as part of a military flying club or after they leave the service. The experience can be very enjoyable and rewarding. It's great to be able to take your wife and family for a weekend trip to a vacation resort. And when is the last time you've flown anywhere VFR? There is no reason the military pilot should have any problem transitioning to light planes. We military pilots are the beneficiaries of unexcelled training and invaluable experience that counts regardless of what type of aircraft you fly. The only real obstacle in transitioning to light planes is attitude. If you approach general aviation as if you were transitioning to a new type of military aircraft, a whole new world of safe, enjoyable light plane flying awaits. If not, you may prove the hard way that light planes can kill as easily as jets.

Flush or Recessed - *Which is better?*

By LCDR Frank Roberts
COMNAVAIRLANT LSO



*INCLUDES 2 DAY CASE III MISHAPS

Fig. 1

DURING a recent visit to one of our carriers, I had the opportunity to get involved in a discussion with one of the staff LSOs concerning the subject of lineup. The discussion was brought about because of a minor mishap 2 days prior involving an on-deck collision between an S-3 on a bolter and an A-7 parked on the foul line. Fortunately, no serious damage was done and no one was injured, but it did bring back memories of previous tragedies. If nothing else, it caused the CAG LSOs to do some serious thinking about lineup.

Anyone who has ever waved airplanes aboard a ship recognizes that lineup is the most difficult parameter for the LSO to visualize, particularly at night. Recognizing this, it was this CAG LSO's perception that over the past few years, more carrier landing mishaps involving lineup had occurred in AIRLANT CVs than AIRPAC CVs. The question then occurred to me – was this perception *true*, and if so, why?

We began by examining some possible "why's." What differences were there between AIRLANT and AIRPAC CV operations which might produce a difference in the frequency of occurrence of lineup mishaps?

The following factors affecting carrier landing operations were determined to be constant or nearly constant between coasts and type commanders:

1. FRS pilot training syllabi
2. Available CO training devices
3. LSO training
4. Embarked operating tempo
5. Pilot experience and carrier exposure
6. LSO experience and carrier exposure

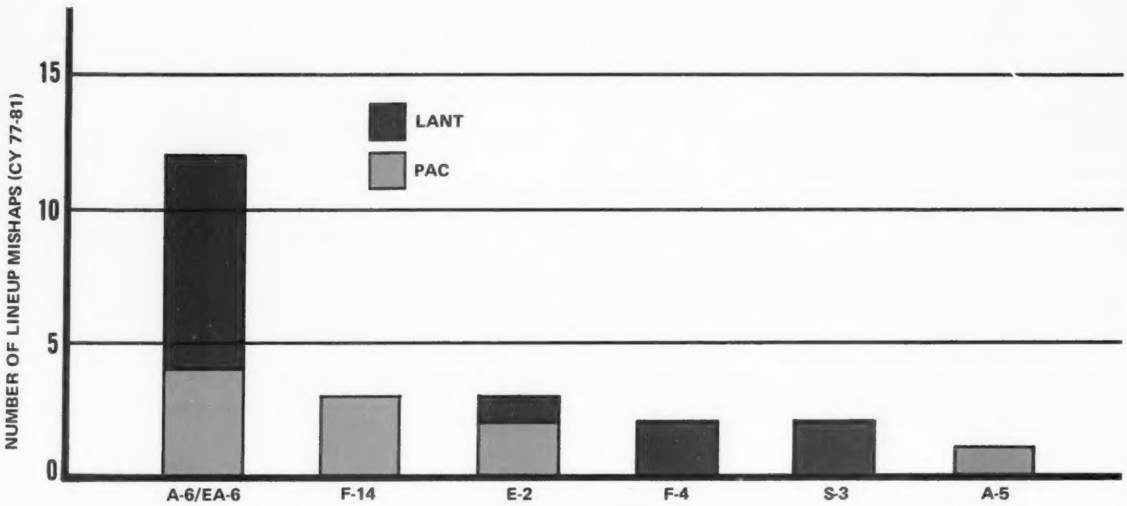


Fig. 2

Indeed, the only significant difference we could find was LSO platform elevation. It seems that there exists a philosophical dichotomy between AIRLANT and AIRPAC concerning LSO platforms (this occurred before my time and I'm unable to ascertain why). All AIRLANT carriers have recessed platforms, while AIRPAC carriers have flush deck platforms. This realization then gives rise to the question: does the LSO's height of eye or ability to get closer to the landing area on a flush deck platform improve his ability to see lineup and consequently prevent lineup mishaps?

Having "grown up" as an LSO on the East Coast, with my waving experience confined to recessed platforms, my initial reaction was that the answer was "yes." The next step was to use Naval Safety Center CV landing mishap data to prove or disprove the theory. Using a 4-year sample and discounting those mishaps in which aircraft malfunctions were a factor, I derived some interesting statistics which are summarized in Figs. 1 through 3.

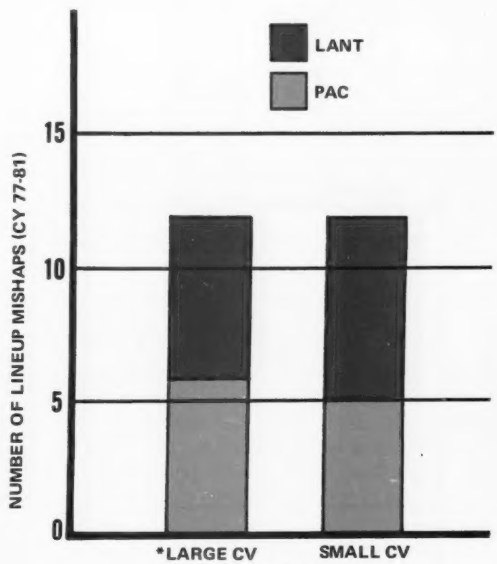
1. A-6/EA-6 aircraft account for 50 percent of the lineup mishaps.

2. Side-by-side seating aircraft (A-6/EA-6/E-2/S-3) account for 70 percent of the lineup mishaps.

3. Large deck versus small deck statistics are the same.

4. Lineup mishaps occurred with virtually the same frequency – day or night.

But what about the original question? Unfortunately, the comparison presented in Fig. 1 does not warrant the conclusion that LSO platform height is a factor in the LSO's ability to see lineup.



*CV-63 AND SUBSEQUENT

Fig. 3

What about other factors? Since the numbers were available, I decided to do a similar comparison of ramp strike mishaps over the same period to see if LSO platform height affects LSO ability to perceive glide slope deviations. That information, subject to my interpretation, is summarized in Figs. 4 through 6. The significant factors are:

1. Seventy-four percent of the ramp strikes occurred on AIRLANT carriers (recessed LSO platforms).
2. Eighty-one percent of the ramp strikes occurred at night.
3. Single-seat or tandem-seat aircraft (A-7/F-4/F-14) account for 87 percent of ramp strikes.
4. Seventy-four percent of the ramp strikes occurred on small deck carriers.

In conclusion, I feel it is highly likely that the difference in LSO height of eye with respect to the landing aircraft

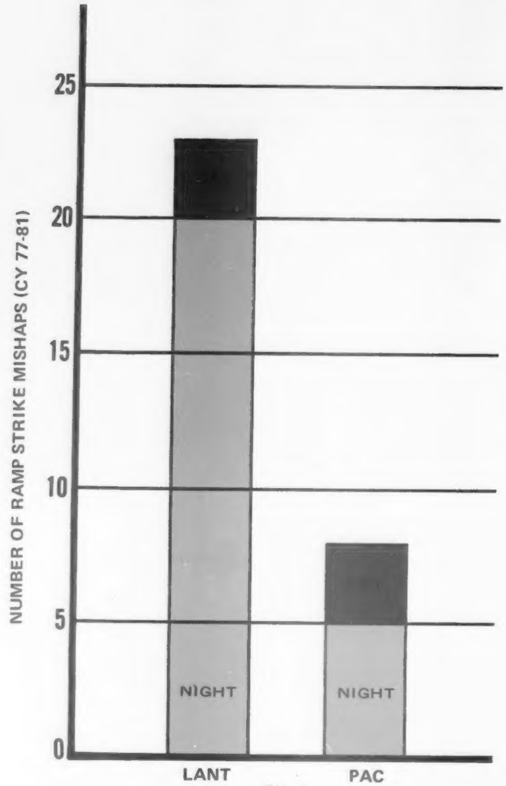


Fig. 4

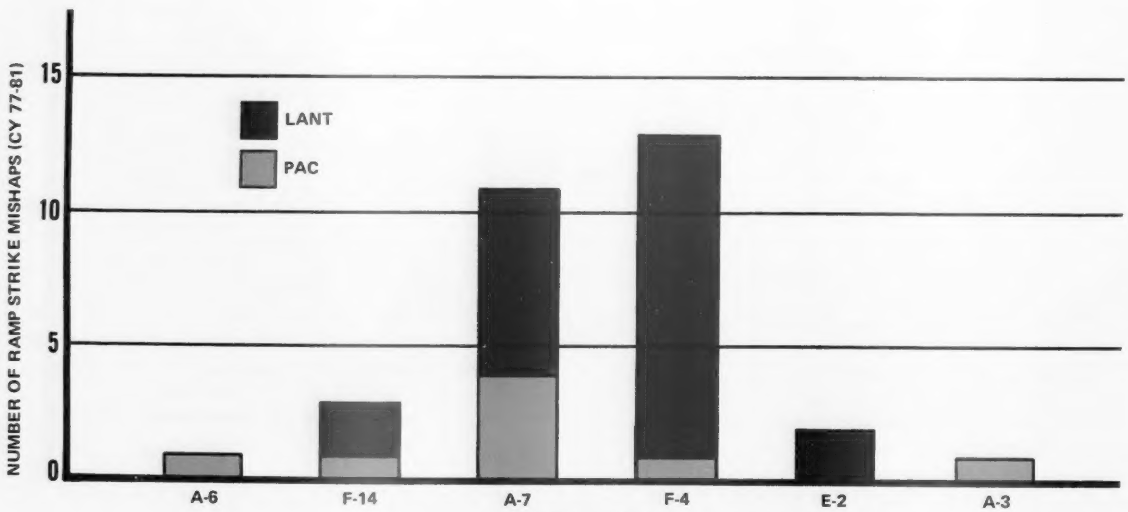
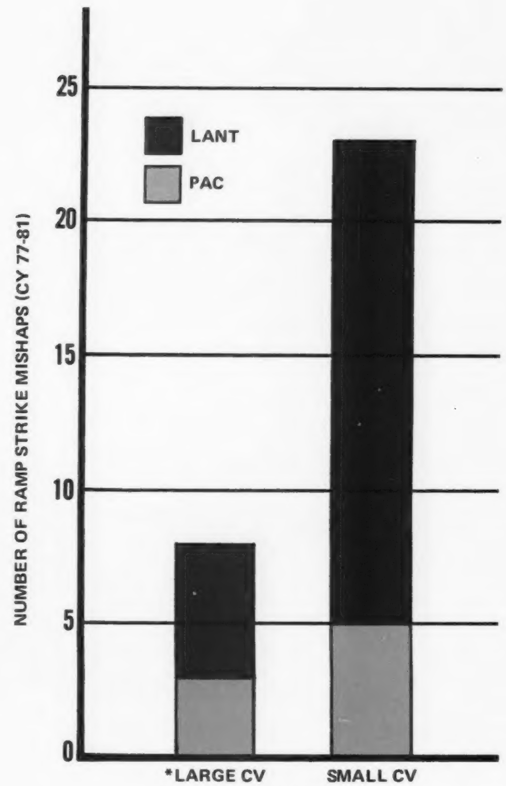


Fig. 5



*CV-63 AND SUBSEQUENT

Fig. 6

and flight deck affects the ability to perceive glide slope deviations. But, is it safe to conclude that flush deck LSO platforms are better than recessed platforms? It is a difficult question, most probably without a clear, black-and-white answer. Suffice it to say that until a more scientific analysis is undertaken, LSOs waving from recessed platforms should be aware of the increased statistical difficulty in perceiving glide slope deviations.

Note: Nothing has been said about the safety aspect, for the LSO, of flush versus recessed deck platforms. Interestingly enough, only 3 days after this article was prepared, I happened to be on a recessed platform when a purchase cable separated on arrestment. The flailing cable, which killed two personnel, came back and struck the LSO platform. Fortunately, no personnel on the platform were seriously injured. It is my opinion that the recessed platform saved us from serious or fatal injury.

LT Kirk Putnam (left)
1stLt D. R. Neumann (right)

On 3 November 1981, LT Kirk Putnam (instructor) and 1stLt D. R. Neumann (student naval aviator) were Dash 2 in a two-plane TA-4J CNATRA formation sortie. After numerous break-ups and rendezvous, the flight was separated for individual work, with 3,200 pounds of fuel indicated. Approximately 1 minute after separating, LT Putnam noticed his fuel gauge was reading 550 pounds with a corresponding low fuel light. Quickly analyzing the problem as a possible stuck float valve, LT Putnam took control and put positive and negative G on the aircraft. This appeared to solve the problem momentarily; however, the low fuel light again illuminated with the fuel gauge indicating 550 pounds. Positive and negative G were again applied without result. LT Putnam turned the aircraft toward the nearest divert field, selected EMERGENCY TRANSFER, and proceeded on a bingo profile. Noting that EMERGENCY TRANSFER was not alleviating the situation, and realizing they did not have enough fuel to make their primary divert field, LT Putnam and 1stLt Neumann decided on a small civilian airfield. Although only 3,200 feet long and 60 feet wide, circumstances dictated its use. LT Putnam had 1stLt Neumann broadcast on Guard and set up for a landing. On touchdown, with spoilers deployed, maximum braking was applied and the aircraft was stopped in 2,800 feet without damage. The fuel gauge indicated 200 pounds. The superb professionalism, airmanship, and subsequent actions displayed by LT Putnam and 1stLt Neumann prevented the possible loss of an extremely valuable aircraft.

BRAVO ZULU

LCDR Patrick "Duck" Drake
LT Tony Chifari

An SH-3H aircrew from HS-6 recently experienced an emergency that many helicopter pilots fear most — catastrophic material failure of a vital main rotorhead component. In a flight of three H-3s at 7,000 feet over the California coast, LCDR Patrick "Duck" Drake (HAC) and LT Tony Chifari (copilot) heard a loud "crack" which was immediately followed by a violent drop in altitude and an extremely severe vertical beat with strong airframe vibrations.

Despite being firmly strapped in, both pilots were bounced up and down, completely out of their seats. LCDR Drake's kneeboard was ripped from his leg. A plane captain in the rear cabin was forced through his troopseat and found himself sitting on the deck. The cockpit instruments were rendered unreadable because of the vibrations.

LCDR Drake entered an immediate autorotation, notified the flight leader of the severe vibrations, and instructed LT Chifari to secure the primary hydraulic system in hopes of eliminating the problem. Securing the primary had no effect, and the system was turned back on. LT Chifari squawked emergency, put the gear down, and started searching for a landing site. During the descent, the other two helicopters relayed information to ATC, rigged for rescue, and followed their distressed squadronmates down.

The strong vertical beat and vibrations decreased somewhat during the autorotation, making it possible to determine the helicopter's airspeed to be approximately 90 to 100 knots with a 2,000 fpm descent. As LCDR Drake applied up collective to arrest the rate of descent, the vibration level increased dramatically. He again started bouncing out of his seat. The collective was lowered, once again resulting in a more manageable ride. A farmer's field, which had been picked out straight ahead, was not as flat as it appeared from higher altitude. The crew decided to go for an empty school football field, off to the right. While still in the autorotation, LCDR Drake reached a wide 180-degree position and started the approach. Near the 90-degree position, a hill with trees and a telephone line made adequate ground clearance questionable. LCDR Drake beeped the nose back, decreased airspeed to about 80 knots, and slowed the descent enough to clear the obstructions by 75 to 100 feet.

Rolling onto final, with collective still lowered, LCDR Drake gradually beeped the nose back. As the airspeed bled off, the rate of descent decreased. When the aircraft entered ground effect, the descent slowed enough to enable LCDR Drake to rock the nose forward and make a minimum power, no-hover landing. The aircraft rolled to a halt within 15 feet, and an emergency shutdown was accomplished.

A postflight inspection showed that the main rotor head rotating swashplate had fractured at the lower pitch rod attaching point. This resulted in the loss of the No. 5 pitch control rod, which damaged the spar and one pocket of the No. 5 main rotor blade when it departed.

Throughout this trying experience, the crew performed as true professionals. Their superb airmanship, cockpit coordination, and coolness under stress saved an aircraft and the six lives onboard.

Short Final

By LT A. W. Hammond
HSL-35

I REMEMBER when I first went to see the Sistine Chapel in Rome. Crowds of people were looking skyward as they wound their way through the corridors, passing up untold art treasures, because they'd come there to see one thing, and one thing only – the beautiful ceiling by Michelangelo. I don't think anyone has ever taken a good look at the *floor* of the Sistine Chapel, or the surrounding walls.

It's the same thing with compressor stalls in helicopters flying in a saltwater environment. Everyone *expects* a stall over saltwater to be associated with saltwater ingestion, with the emphasis on training being almost exclusively on deceleration stall flight techniques. In other words, deceleration stalls have become the Michelangelo ceilings of our saltwater emergency expectations. Well, there are plenty of other ways to stall a compressor, as we found out one night flying over the Pacific.

My OIC and I were out conducting day and night doppler work, with an SSSC sweep thrown in for variety. The preflight brief had included standard warnings concerning salt encrustation and the ensuing compressor stall should the salt ever build to excess. We exercised due caution in the dopplers and experienced no salt spray on the windshield,

which indicated an equally low amount of salt spray being ingested by the engines. We finished our doppler work and took off to visually identify a surface contact.

During the trip to the contact, the weather gradually turned from partially scattered to broken and headed for overcast at about 1,000 feet. The moon was fairly bright and provided a discernible horizon when it could break through the cloud cover. There were some isolated rain cells in the area but none close enough to be of any consequence. As we flew, the sky slowly turned black.

The ship had set flight quarters and had a ready deck upon our return. We had enough fuel for two or three bounces, which we requested and were approved. My HAC, generous guy that he is, allowed me to do the first approach. The tower called winds 90 degrees to starboard at about 5 knots, so I set up for a port-to-starboard approach. I drove down the glide slope and picked up the deck environment at about one-half mile. There was a minor problem with the deck lighting, so we made a call to our ship's tower to try and rectify the situation. As I closed to within one-quarter mile, the lighting was still wrong, so we placed another call, and I commenced a waveoff at about 80 feet AGL, 30 KIAS, 100 yards from the deck.

I lowered the nose and rolled right to pass astern of the ship while I raised the collective to climb back to a comfortable altitude. As I applied power, my rearview mirror reflected a multitude of sparks coming from the exhaust of the engine. Just as I was going to bring this to the attention of the HAC, the engine suffered a series of very audible detonations and then spit fire rings out of both ends. I froze the collective and rolled wings level as I beeped up both engines, purely as a reaction to my training in simulated engine failures.

There was no doubt in either of our minds that we had just had a total compressor stall. For an instant, I thought it couldn't be happening. It didn't bother me that it was happening to me – what *did* bother me was that the engine stalled as it was accelerating. Whenever compressor stalls had been addressed in my H-2 past, the lectures had always concerned *decelerating* stall as a result of excessive salt encrustation, and we hadn't taken in any salt. One quick scan of the instruments removed any doubt. We'd stalled, all right! We then completed our emergency procedures, contacted our ship, and flew a single-engine approach to a no-hover landing. Finally, we conducted the shutdown as normally as we could and started breathing again.

We were fortunate enough to be able to see the engine after AIMD had torn it down. The third through seventh compressor stages had sustained extensive damage, although none of the blades had broken loose. The helo had been checked over thoroughly several times for possible sources of external FOD, but none could be found. The FODing occurred far enough away from the ship so that the ship could be ruled out as a source. The lack of a source of external FOD combined with the condition of the first two stages (very minor damage, and all of that on the trailing edges) leaves only internal FOD as the culprit, but that source, as well as the FOD itself, could not be found.

FOD will, of course, cause a compressor stall, as it did in this case. We in the LAMPS community talk about compressor stalls associated with deceleration – almost to exclusion. The emphasis on deceleration stalls has been effective in helping us avoid situations that would cause them, but we need to consider other forms of compressor stalls in briefs and training. Although discussion of these conditions may not always prevent mishaps, it will prepare the aircrews better and possibly reduce the surprise and confusion in the cockpit when such an event happens again.

I've got one other point – the case for recovery from a single-engine failure at low altitude and airspeed. H-2 pilots practice this type of single-engine failure from a 40-foot hover. This is done to show that recovery can be effected (given the right conditions) and to prepare pilots in the event they experience an engine failure in a doppler hover. This close call highlighted that theory. We were already light, at twice the altitude, and had 30 knots on the airspeed indicator. The reaction was probably as quick as an unsuspecting pilot can make, yet we lost 40 feet and 7 percent N_r while only gaining 20 knots. The thought of setting your H-2 in the water is not an appealing one, but you stand a better chance of surviving a single-engine water takeoff than you do a water impact at 20-30 knots and low N_r. This option makes you a prime candidate for a decelerating compressor stall, but you will know that it's coming, and then you can control when and where it will happen if it does.

Knowledge won't prevent some of these misadventures, but preparedness can keep them from becoming more extensive and damaging than they need to be. There's no doubt compressor stalls will continue to occur. Hopefully, my dues are up to date. In any case, this experience has shed some new light for me on a neglected subject, and I know of at least one crew that's just a little more ready for its next encounter with an accelerating compressor stall. ◄

Some things never change

anonymously submitted

IT was a dark, quiet, and lonely night, perfect for ravens and other Edgar Allen Poe characters, as I sat pondering the untold mysteries of "Ditching Procedures" in the NATOPS Manual.

The telephone broke the silence. When I answered, the concerned voice of a lieutenant (jg) at the other end intoned those familiar words: "This is the duty office. Is LTJG ——— there?"

The particular lieutenant (jg) to whom he referred was my roommate, a pilot assigned to an operational "fleet" squadron homebased at the same field where I was stationed as an instructor pilot in the fleet readiness squadron (FRS). I was also the FRS's brand new ASO, just back from Monterey and ready to set the world safe.

"No, I'm sorry, he's out right now. Can I take a message?"

"Do you know when he'll be back? Have him call the duty office right away. It's *very* important."

The young JG's inflection (I was a salty-old, fleet-experienced lieutenant, an FRS instructor, a Stan Board member, and an ASO, after all) brought back scores of deployment memories in an instant . . . my "fleet ears" pricked up, and a little voice in the back of my head said, *"Zero-dark-thirty preflight, going on a det. Pack a suitcase!"*

"Okay, I'll have him call. I don't know where he is, but he left 4 hours ago with a friend who's been visiting for the week. This friend is leaving tomorrow, and they're probably out on the town somewhere."

"Have him call right away. It's pretty important."

CLICK.

With my safety officer's suspicions aroused, I wrote the note. "Call the duty office right away. Sounds like another good deal . . ." I closed, of course, with the appropriate smiling "happy face" (comic relief) and notations of the time received, 2230 (serious efficiency).

Sure enough, 'round about 2345 the boys came rolling in, smelling of booze and talking about old times. The note was met with a comment of resignation. "Uh-oh, what *this* time? Tomorrow is supposed to be a day off with a squadron picnic."

"Hello . . . yeah . . . 0900 . . . yeah . . . okay . . . Yunno, I've been drinking, man – I'm pretty sauced . . . yeah . . . other people in the same boat, huh? . . . okay . . . 0900."

CLICK.

Images started flashing through my mind as the one-sided conversation unfolded. Images of my old squadron on deployment. Faces. Places. The buddies I had who flew into a mountain after getting "pretty sauced" the night before – no, the morning of their flight. The CO during that deployment who wrote his own rules, the "unwritten waivers." Those same "unwritten waivers" I had just learned about in safety school for the last 6 weeks. Famous quotes came flooding back . . . "Roger (my old plane commander), NATOPS was not meant to tie a CO's hand!" Then the crews started writing their own waivers until one well-trained but poorly-led crew climbed into a multimillion dollar platform and flew it into a mountain. They were asleep, hung over, or a combination of the two.

"We let a crew drink, then drive an airplane into a mountain a few years ago. The same things that were going on in that squadron then are going on in your squadron right now."

Unwritten waivers.

The hair was standing up on the back of my neck now. The ensuing argument featured me quoting NATOPS, famous quotes, unwritten waivers, safety school statistics, on and on – and making statements to my roommate concerning the lack of (a single) hair on a certain part of his anatomy.

The responses I heard sounded like a tape recording from the past. Some things never change.

"It's *real* important." (Rebuttal.) "No, but last time they sent us up there it *was* real important . . ." accompanied by raised eyebrows, saying "TOP SECRET! TOP SECRET! Can't talk about it here." (Rebuttal.) "But our safety officer's a lieutenant commander who won't stand up to the CO. He's too worried about his career." (Rebuttal.) "But the CO would order us to go anyway; he's trying to impress the admiral." (Rebuttal.)

I had heard them all before. The argument was no good. It didn't matter how many times I told him *"I've seen* that movie" . . . *"I've been in* that movie!" No go. And it ended the same way all the similar arguments in my old fleet squadron had ended:

"Besides, I don't care. I'm getting out, anyway."

Silence.

The friend from the Midwest started looking a little nervous by this time. His leg was bouncing up and down. He was a commodities futures trader from Chicago, and he was obviously wondering what the state of our nation's defense was and when the argument he was witnessing was going to end.

The subject was switched back to drinking and old times, and they carried the conversation.

I said good night and retreated to my lair, taking the CNO's tome on "Training and Operating Procedures Standardization" with me.

I was starting to feel like Edgar Allen Poe now – or as black as his raven. "Nevermore," quoth the raven inside me as I picked up the extension in my bedroom and dialed the squadron duty officer.

"Good evening, ——— duty office, LTJG ———, not a secure line. May I help you?"

"Yes, this is LT ——— of (FRS). I'm the ASO at (FRS) across the field, and I was wondering if you've informed your safety officer and your operations officer that members of the crew you're launching at 0900 today have been drinking and will be in violation of NATOPS?"

SILENCE.

"I know you're afraid to answer that, so I'll make it easy for you. You may have read about the fleet squadron I was in. We let a crew drink, then drive an airplane into a mountain a few years ago. The same things that were going on in that squadron *then* are going on in your squadron ***right now***. If you haven't passed the word on to your superiors, you're at fault. If you *have*, and they're ignoring it, they're at fault. Which will it be? Do you want the blame, or will you let *them* make the mistake?"

SILENCE.

Then a weak response, "Uh, gee, uh, thanks for your concern. Yeah, I heard about you guys. Yeah . . . thanks for the call."

The weight off my chest, my white safety hat glowing in the darkness over my head, I laid myself down to sleep.

At 0900, the crew preflighted. At 1100, they departed. Some things never change.

"Forevermore," quoth the raven, "forevermore." ◄

PRIVILEGE vs. PUNISHMENT

By CDR K. D. Sullivan
Commanding Officer
VP-31
and
LT W. C. Haug
Aviation Safety Officer
VP-31

They're not inscribed in marble. They're dynamic publications which

IN an age of legal liberality, when the pendulum has swung to the side of *protection of individual rights* and the military has adapted accordingly, supervisors and leaders often walk around on the proverbial horns of a dilemma. Any program that grants privileges or provides for nonprejudicial statements and admissions is viewed suspiciously as yet another imposition against a supervisor's traditional ability to mete out punishment or a commanding officer's freedom to discipline an errant servicemember. Thus, when the old idea of safety privilege was given new clothing in the rewritten Safety Program (OPNAV 3750.6M), and new emphasis at the same time, undoubtedly many in leadership positions rolled their eyeballs skyward in frustration.

Despite comprehensive and concise courses teaching the philosophy and methodology of the Naval Aviation Safety Program to prospective commanding officers and aviation safety officers at NPGS Monterey, some still operate under the misconception that safety privilege is some sort of safety equivalent to the old drug exemption program. This prompts visions of derelict and negligent personnel destroying command assets, then thumbing their noses at authority and escaping accountability under the label of safety privilege.

In short, misunderstandings of the origin, purpose, and role of safety privilege and of the root philosophy of safety programs in the Navy result in the following misconceptions:

- The philosophy and methodology in command safety programs, in regard to the mechanics and value of discipline, are different from most other command endeavors.
- The price of full disclosure after an adverse occurrence is tolerance of problematic, gross dereliction of assigned military duties.
- We are drifting away from personal accountability as the basis for command safety programs.
- The breaking of safety rules (negligence or willful departure from established safe operating procedure) is viewed differently from the breaking of rules governing administra-

tive, tactical, or military responsibilities and is punished differently.

- Punishment is becoming increasingly damned as having no place in the business of command.

A commanding officer laboring under these misconceptions is sure to end up questioning the wisdom of safety doctrine, and he may shove his safety department and safety program off to the side, out of mind, regarding it as just another of those newfangled programs (perhaps inspired by the social scientists) that doesn't fit into the structure of the military organization. This can be a death knell for any truly active and influential safety program.

How are such misconceptions at variance with the true philosophy of a command safety program? Why have COs come to hold these erroneous beliefs? How should things really work, if we are to follow the letter and spirit of the OPNAV directive and establish our own command safety programs to "preserve human and material resources"?

Most of the confusion starts with a misunderstanding of safety privilege. Picture yourself the commanding officer of a flying outfit which had an adverse occurrence involving a naval aircraft.

The damage or injury requires classification of the event as a naval aircraft mishap and, in accordance with OPNAVINST 3750.6M, the standing aircraft mishap board (AMB) investigates. Their mishap investigation report (MIR) is privileged in that it shall be used *only* for safety purposes. The AMB has been fastidious in its observance of the instruction's requirements, and no one other than the board members knows the content of the report or its findings.

You, the CO, come to work one fine day to find the rough copy of the MIR message sitting in your "in" basket, ready for you (the releasing authority and, in this case, AMB appointing authority) to review for adequacy. CO endorsements are no longer included in MIRs, and release of the MIR by the command does not constitute concurrence with the findings, only adequacy of the report.

You learn by reading the MIR that the erring personnel:

- Were fully qualified and knowledgeable.
- Knowingly violated instructions, policy, and directives.
- Consciously selected an improper course for the sake of expediency, accepting inordinate levels of risk and reflecting an intolerable departure from directed safety practices.
- Were without any reported or discovered physical or psychological reason for their impaired performance or endangerment of shipmates and equipment.

In short, they knew what was correct and could reasonably be expected by supervisors to do the job properly, without monitoring.

Your immediate, uncompromising response is one of extreme and justifiable dissatisfaction, and the safety officer is immediately summoned amid cries for punishment and retribution against the derelict personnel. You, however, do not yet have a case. Your safety officer will probably refer you to the senior member of the board for any discussion of specifics of the MIR. His general advice, however, will be that nothing you learned from that MIR may be used as grounds for punitive action against anyone.

And he will be right. Unless you and your organization had the foresight and perception at the outset to launch a concurrent JAG investigation, you could be "up the creek without a paddle." A separate JAG investigation might now be initiated, but it would be hampered by the fact that time had elapsed and individual memories of events will be hazy. It

can and should be changed by the users.

would also be rendered useless if it is convened on the basis of information from the mishap investigation report.

Does this mean, as some decriers of safety may erroneously think, that there is no place for punishment, accountability, and good ol' military leadership in connection with mishaps? Of course not!

First off, if you identify your safety program or safety department only with their investigative role, *which is the only place that safety privilege enters into the scheme of things,* you're in trouble to begin with. Your safety department should be spending most of its time working *with* the rest of your command to prevent mishaps. If all it ever does is investigate them, you're way behind the power curve.

As stated previously, there *is* a place for punishment, but not in connection with a safety program. The goal is to encourage behavior that is safe and to discourage behavior that is unsafe. To do this, there have got to be both positive and negative strokes. If the only place you're finding out about derelict behavior is in a privileged safety report, it's not an indication that there's something wrong with the safety doctrine – it's a clue that something is awfully wrong with the whole outfit!

Where was the supervisor when this happened? Are there not any good citizens at the shop level who observed violations and are willing to discuss them with a JAG investigation team? Was a JAG or one-man informal investigation even launched? Was the command aware of a possible need? (Remember, if in doubt, start one. It can always be terminated later.) Use JAGINST 5800.7A, the "Manual of the Judge Advocate General," paragraph 0902, to determine when an investigation is required.

Or, even worse, is the command subtly or blatantly promoting unwritten waivers of safe practices for expediency, thus undercutting the entire program to the extent that those in the trenches, out there doing the job, don't really know what's most important and what behavior is desired?

The short of it is that safety privilege puts no handcuffs on the commanding officer's punishment authority in the aftermath of a mishap. It just means that he's got to get the information which forms the basis for the punitive action from a separate source, the most effective being formal or informal JAG investigations. This means that the command must be as fastidious and uncompromising in its investigation on the legal side as it is on the safety side.

This isn't easy, but it's the price we pay for safety privilege, which has been proven to be the best guarantee that, ultimately, we find out *why* something happened in order to *prevent* it from happening again.

What, then, is the role of accountability, discipline, punishment, and military leadership? As stated previously, most of your safety department's time should be spent preventing mishaps. That's the name of the game. One could almost go on forever, discussing different particulars, raising individual awareness, identifying and reporting hazards, and conducting active enlisted safety councils.

But the big common denominator in the whole scheme is that you've got to get everybody in the organization to do things *the right way*. That's all there is to it. Everyone knows we already have the "right ways" of doing things written down. We've got so many of them that we have a hard time remembering them all and have to continually train to keep them in mind. They're called NATOPS, MIMs, TIMIs, OPNAVS, and scores of other names in the form of command instructions. They're not inscribed in marble. They're dynamic publications which can and should be changed by the users. And they *can* be, through Technical Publication Deficiency Reports, Hazard Reports, NATOPS changes, and so forth.

One job of the safety department is to help the command keep doing things the right way. This is accountability before the fact of a mishap. Accountability after the fact of a mishap does not come under the cognizance of the safety department.

President Harry Truman, once known to have perfected the philosophy of accountability ("The buck stops here"), said after his 1948 campaign for the presidency, "The feeling I got in that campaign was that most of the people in this country are not only . . . decent people, they *want* to do the right thing. And what you have to do is to tell them straight out what the right thing *is*."

This is a philosophy that is believed to be true and has been found to be successful in squadron application. From day one a commanding officer must tell his squadron, and every man at every level in the chain of command must understand it and believe it, that the safe way is the *only* way to do things. The right way is the safe way. And they must know right off that *every one* of them will be held accountable for knowing the right way, and if they fail to do it that way, notice will be taken. If punitive or nonpunitive remedial action is justified, it will be taken.

It is absolutely essential that this message come from the highest level in the command and be repeated and supported at every step of the chain, down to the junior airman or seaman recruit.

The results of this simple application of basic philosophy will always be remarkably effective. The squadron's "Anymouse" program will be more active than it's ever been, by several multiples. Every man will become involved, fancying himself a hazard reporter and fixer. The enlisted safety committee will not only dream up agenda items, but will act on them, frequently solving them without any action outside of the committee itself being necessary. The committee, unlike most other bodies in the command, contains members from every shop and department, at the *working level*. The awareness of personal accountability will heighten. Individuals and departments outside the safety department will think about safety, talk about, and even submit *unsolicited* articles for the squadron safety newsletter . . . and the list goes on.

In short, all program success will be the result of little more than basic ol' military leadership combined with enlightened advice from a motivated and active safety department. The key will be command-level statements and chain of command endorsement of the unit's top priority – "Safety is No. 1."

Admittedly, other pluses are essential – generally high morale, good communications, highly qualified and motivated personnel, and quality supervision. But the root principles of safety apply in any setting, and they rest on the simple philosophy that people want to do the right thing. All you've got to do is make sure that they know straight out what that right thing is, and that they're accountable for it.

When the rush is on, BEWARE!

By Russ Forbush
APPROACH Writer

ANY naval aviator who's been rushed into a launch by air bosses, flight deck crews, or others at the helm and hasn't cursed them for their inconsiderate behavior must be a rarity indeed. Readyrooms have provided the setting for countless numbers of unsavory pilot tirades directed toward those responsible for flinging them into the air with undue haste. But how many pilots, do you suppose, have publicly hurled invectives at *themselves* for rushing a flight unnecessarily? Not many, I'll betcha! The two examples which follow provide an insight into what can happen when pilots hurry to get their aircraft airborne. While there were no injuries, and aircraft damage was not excessive, the possibility of a catastrophe existed in each case.

The story behind the missing doors. An F-14A pilot and RIO were scheduled for a 1 vs. 2 ACM sortie. The adversary aircraft were a double-cycled A-4 and F-5. Due to a scheduling error, the *Tomcat* crew began briefing 45 minutes late. In order to make the takeoff time, the brief was rushed and lasted only about 10 minutes. Manup and prestart checks were normal, except that the pilot did not wait for the starboard engine daily door to be opened for preflight. The RIO preflighted the starboard engine and cavity after the daily door was opened. Start and poststart procedures were not rushed, and the RIO had ample time to get a full alignment and onboard checkout.

During poststart checks, the pilot noticed that one of two parallel runways in use was closed, the overhead pattern was busy, and aircraft awaiting takeoff were stacking up. Keenly aware that the F-5 was fuel critical, the F-14 pilot realized that any delays could result in no training being accomplished. After waiting 4 or 5 minutes for the plane captain to locate a troubleshooter for final checks, the pilot decided to taxi without using a final checker. In the pilot's rush to get moving, the plane captain failed to notice that both the port and starboard daily doors were not secured. He signaled the F-14 to taxi clear of the line. (Although it was the plane captain's responsibility to ensure that the daily and miscellaneous inspection doors were closed, this was not specifically mentioned in squadron plane captain training programs or maintenance instructions.)

The RIO was head down in the cockpit, performing radar checks, when the pilot said, "We're taxiing." The RIO questioned in his mind if the final checks had been completed, but since the aircraft was nearing the taxiway, immediate taxi clearance and taxi lookout duties took precedence. Unfortunately, there were no other aircraft en route to or at the hold short area that might have alerted the F-14 crew that the daily doors were not secured.

Continued

Takeoff, departure, and the flight to the ACM area were uneventful. On vector to the first engagement, and in ZONE THREE afterburner, the pilot felt "two airframe thumps." He checked the engine and other instruments and cycled the throttles to military and back to ZONE THREE. The pilot initially thought he had a mild compressor stall, but all engine instruments remained normal. He completed the mission and returned to base, where a successful landing was made. Following landing, the crew was notified by the tower that a panel on its left side was missing. Upon turning into the line, the F-14 was informed by another aircraft that its right engine daily door was missing.

The postflight maintenance inspection revealed the following damage which occurred when the daily doors fell from the aircraft:

- The port and starboard sponson panels were gouged.
- The port and starboard service panels were bent.
- The starboard auxiliary flap was punctured and bent.
- The port cove door was dented.

There were several cause factors associated with this mishap. The plane captain knew full well that the aircraft hadn't been given a final check, and he failed to observe the open daily doors. Had the CDO recognized the increased potential for a mishap and cancelled the flight for lack of a proper brief and sufficient time, the mishap wouldn't have occurred (he reasoned that the pilot would continue to exercise his demonstrated superb discipline and judgment). Unfortunately, this was not the case. ***The pilot admitted that he intentionally bypassed the final checker because he was late and didn't want to miss the range period.*** Thus, he knowingly violated NATOPS and pressed on.

One *Sidewinder* not on target. An A-7E was scheduled for a joint Navy/Air Force exercise, with a hard takeoff time from NAS Homeplate. The pilot briefing went off on time, and the maintenance crew arrived at the aircraft 60 minutes prior to launch time. The *Corsair II* was not ready for flight at the normal manup time of 45 minutes prior to launch. The daily and turnaround inspections were completed 30 minutes prior to takeoff time, and pilot preflight and ordnance loading began immediately thereafter.

The ordnance load consisted of six Mk-76 practice bombs to be loaded on Stations 1 and 8, and one AIM-9 *Sidewinder* missile on Station 4. The missile was hand carried to the A-7 by the three-man ordnance crew. A missile locking wrench pin was not available at the aircraft when the *Sidewinder* arrived. The missile was placed on the launcher and slid forward until it contacted the aft lug. Following this action, the crew leader returned to the ordnance shop to obtain a locking wrench pin. He returned to the A-7 with the pin and placed it in the launcher but did not rotate it, leaving this task to the primary loader. At this point, the crew leader was apprised of a Mk-76 loading gripe on Station 8. While he was on the other side of the A-7, checking the gripe, the primary loader noted that the wrench safety pin was installed on the missile and assumed that proper holddown pin and wrench safety pin procedures had been completed. He then closed the aft fairing hatch and connected the missile umbilical. Upon returning from Station 8, the crew leader noted the apparent proper load completion by the primary loader, so he inserted the detent holddown pin.

During ordnance loading, the pilot was in the cockpit, completing prestart checks. He did not preflight the ordnance load, as he was rushing to get airborne on time. The aircraft was started, taxied, launched, and flown to the exercise area without incident. The first portion of the exercise flight was normal in all respects and included a high-speed, low-level ingress, a 30-degree dive delivery, and a high-speed egress. During egress from the second ACM engagement, the *Sidewinder* tone ceased. A visual inspection by the pilot revealed that the missile was missing from Station 4. After the A-7 arrived back at the unit line, a postmaintenance inspection of the LAU-7 was conducted, and no discrepancies were detected. The missile left the launcher because it had not been slid forward into the LAU-7 locking detents during loading. The only item restricting the missile's aft movement on the launcher was the missile-to-launcher umbilical.

The cause factors associated with this mishap are:

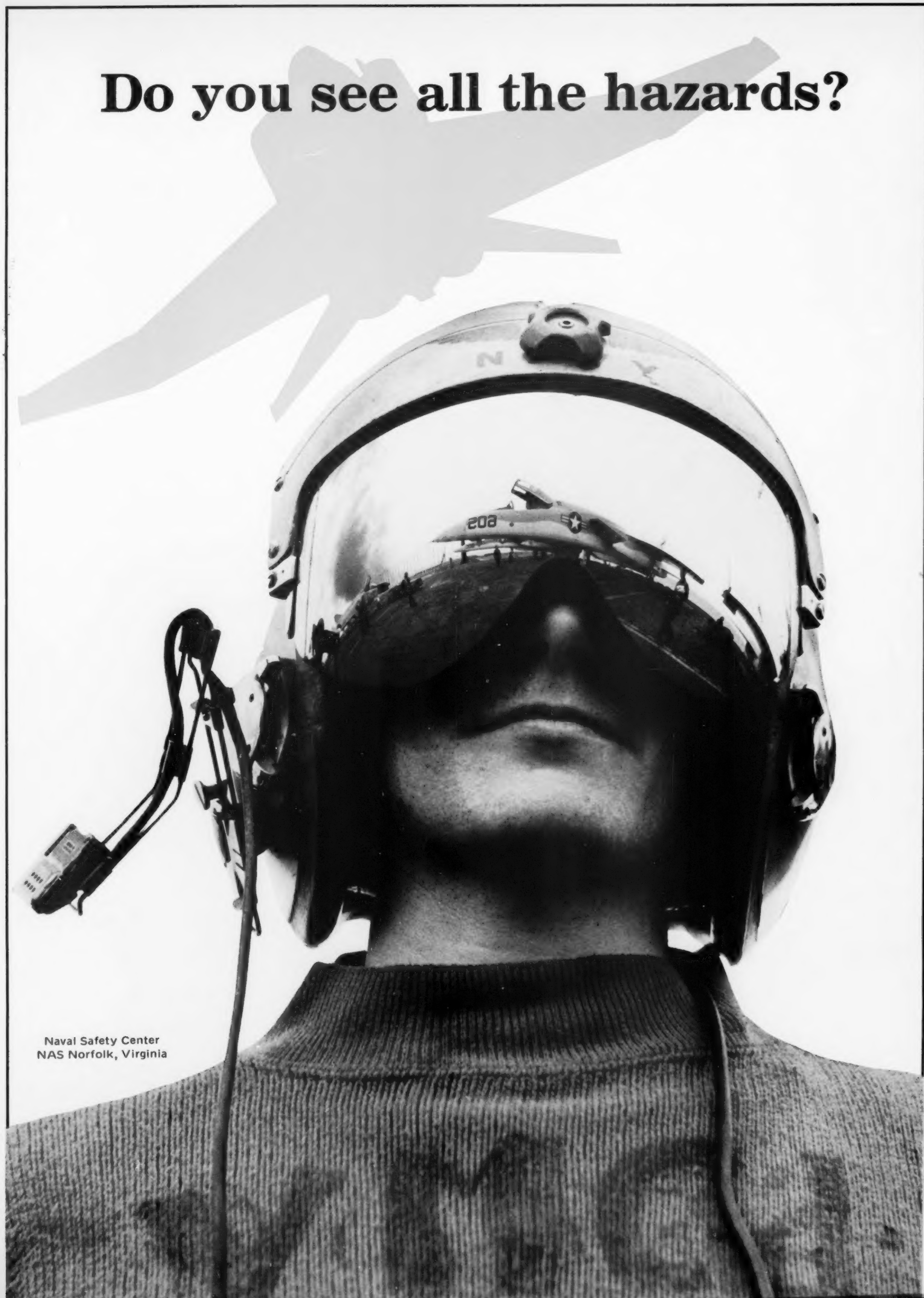
Maintenance – Failure of the ordnance loading crew to properly load the AIM-9 *Sidewinder* missile.

Supervisory – Failure of either the pilot, the maintenance CPO, or the line supervisor to recognize and terminate a rushed evolution.

There are no new lessons to be learned from this mishap. The heavy emphasis placed on sortie completion rates for these exercises, coupled with the relatively simple loading evolutions involved, lulled those in positions of authority to believe that the sortie could be safely launched. Once again, a flight was rushed, and a mishap occurred.

Expedite is a word familiar to all aircrew personnel – it's a requirement of naval aviation. But, like all requirements, it must be tempered with good judgment. Failure to complete required checklists or follow through with proper maintenance procedures is *not* what expediting is all about. It simply means that aviators must systematically prosecute each flight so that the aircraft can be launched on time, but not at the expense of safety. These mishaps are good reminders that when the rush is on – **beware!** – or you just might get sacked. ◄

☆U.S. GOVERNMENT PRINTING OFFICE: 1982—539-005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